

## CLAIMS

### WHAT IS CLAIMED IS:

1. A system to measure fluid flow through a pipeline, comprising:  
  
a positive displacement (PD) meter, said PD meter including a shaft rotating proportionately to a volume of said fluid flow through said PD meter;  
  
a flow computer including a flow computer microprocessor;  
  
an interface coupled between said PD meter and said flow computer, said interface including at least one magnetic pole coupled to said shaft and at least one magnetically-sensitive sensor proximate said magnetic pole but not in contact with said magnetic pole, said magnetically-sensitive sensor generating an electric pulse when placed in the presence of said magnetic pole.
2. The system of claim 1, wherein said magnetically-sensitive sensor is a latched Hall effect sensor.
3. The system of claim 1, said system including eight magnetic poles and five Hall effect sensors.
4. The system of claim 1, said system including eight magnetic poles and five Hall effect sensors, said five Hall effect sensors being arranged according to a geometry having four quadrants, with three of said five Hall effect sensors being in a first quadrant and two of said Hall effect sensors being in a second quadrant.
5. The system of claim 1, further comprising:

a second microprocessor in said interface;  
an analog-to-digital converter in said interface; and  
pressure sensors at least partly in said interface, said pressure sensors providing pressure measurement data for said fluid;  
wherein said second microprocessor transmits data regarding a number of said electric pulses and said pressure measurement data.

6. The system of claim 5, wherein said second microprocessor transmits pulse data to said flow computer, said pulse data including data regarding electric pulses from said magnetically-sensitive sensors and regarding pseudo pulses generated by said second microprocessor.

7. The system of claim 1, said system providing a measurement of said volume of flow and a rate of flow for said fluid through said pipeline.

8. The system of claim 1, further comprising:  
a second multiprocessor in said interface,

wherein said system provides a measurement of said volume of flow based on a count of pulses from said at least one magnetically-sensitive sensor and provides a rate of flow for said fluid through said pipeline based on pulses from said at least one magnetically-sensitive sensor and on pulses generated by said second multiprocessor.

9. The system of claim 1, further comprising:

an explosion-resistant housing, at least a portion of said explosion-resistant housing interposed between said magnetically-sensitive sensor and said magnetic pole.

10. The system of claim 1, further comprising:

an interface microprocessor located inside said interface, wherein said at least one magnetically-sensitive sensor includes a first sensor and a second sensor positioned relative to one another, said interface microprocessor generating pseudo pulses based on electric pulses from said first sensor and said second sensor, said pseudo pulses being timed in a weighted manner to distribute pseudo pulses at predetermined intervals.

11. The system of claim 10, wherein at least 500 pseudo pulses are generated by said interface microprocessor.

12. The system of claim 10, wherein said at least one magnetic pole is an even number of magnetic poles arranged in a circle, a north magnetic pole alternating with a south magnetic pole around said circle.

13. A method to provide a real-time flow rate measurement for a fluid flow through a pipeline, comprising:

receiving a series of electric pulses from a plurality of magnetically-sensitive sensors;

generating a plurality of pseudo pulses in response to said electric pulses, said plurality of pseudo pulses being interspersed with said electric pulses;

providing a flow rate measurement for said fluid flow through said pipeline, said flow rate measurement being based upon both said series of electric pulses and upon said plurality of pseudo pulses.

14. The method of claim 13, wherein there is uneven spacing between electric pulses in said series of electric pulses, said plurality of pseudo pulses being interspersed with said electric pulses based upon the uneven spacing.

15. The method of claim 13, wherein said magnetically-sensitive sensors are Hall effect switches.

16. The method of claim 13, wherein said magnetically-sensitive sensors are latched Hall effect switches.

17. The method of claim 13, wherein said magnetically-sensitive sensors are housed in an explosion-resistant housing and said series of electric pulses occurs by the proximity of magnetic poles to said magnetically-sensitive sensors.

18. The method of claim 17, said magnetic poles being mounted on a shaft protruding from a positive displacement meter.

19. The method of claim 13, further comprising:  
transmitting said pseudo pulses but not said electric pulses to a flow computer.

20. The method of claim 13, further comprising:  
calculating spacing of said pseudo pulses based upon said series of electric pulses.
21. An interface for use in a system to measure fluid flow through a pipeline, comprising:  
an interface for coupling between a positive displacement meter and a flow computer, said interface including at least one transmitter coupled to a shaft and at least one receiver proximate said transmitter but not in contact with said transmitter, said receiver generating an electric pulse when placed proximate said transmitter.
22. The interface of claim 22, said interface further comprising:  
a microprocessor, said microprocessor being arranged to receive an indication of said electric pulse from said transmitter, wherein said microprocessor is programmed to generate more than two pseudo pulses in response to at least a pair of said electric pulses.
23. The interface of claim 22, wherein said microprocessor is further programmed to receive a series of said electric pulses having a first timing relationship and generate a plurality of said pseudo pulses having a second timing relationship, said second timing relationship being dependent upon said first timing relationship.
24. The interface of claim 21, further comprising:  
at least one pressure sensor that generates pressure data;  
an analog-to-digital converter attached to said at least one pressure sensor, to generate a digital representation of said pressure data;

a transmitter to transmit said pressure data.

25. The interface of claim 21, wherein said transmitter is a magnetic pole and said receiver is a Hall effect sensor.